

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application.

Claim 1 is now present in this application and is independent.

Claims 2-10 have been canceled and claim 1 has been amended. Reconsideration of this application, as amended, is respectfully requested.

Reason for Entry of Amendment

The present amendment should be entered as the claims clearly define the invention over the prior art, as explained below. For that reason, entry of the amendment and allowance of the application are respectfully requested.

Rejection Under 35 U.S.C. § 102 and § 103

Claims 6-9 stand rejected under 35 U.S.C. § 102 as being anticipated by Japanese 54-85404 (Norio et al.). Further, claim 1 and 10 stands rejected under 35 U.S.C. § 103 as being obvious over Norio et al. in view of Japanese 58-284468 (JP '468). These rejections are respectfully traversed.

Complete discussions of the Examiner's rejections are set forth in the Office Action, and are not being repeated here.

While not conceding the appropriateness of the Examiner's rejection, but merely to advance prosecution of the instant application, Applicants respectfully submit that claims 6-10 have been canceled, thereby obviating the rejection of these claims.

While not conceding the appropriateness of the Examiner's rejection, but merely to advance prosecution of the instant application, Applicants respectfully submit that independent claim 1 has been amended to recite a combination of elements in a stator including a cylinder whose both end faces are respectively closed by a pair of frames, a movable member having a magnetic body, in which flange sections are formed at both axial ends and outer circumferential faces of the flange sections act as magnetic flux working surfaces, said movable member being accommodated in said cylinder and capable of reciprocally moving in the axial direction thereof, pump chambers being respectively formed between inner faces of the frames and both side faces of said movable

member extended in the moving direction thereof and air-core electromagnetic coils which are wound in opposite directions being fitted around a periphery of said cylinder. Yokes made of a magnetic material are provided to end faces of the electromagnetic coils to face the flange sections of the movable body and an outer yoke encloses outer faces of the yokes. A spacer made of a nonmagnetic material or an air space is provided between adjacent yokes. The movable member is repeatedly moved toward one of the sides according to a magnitude relation between magnetic attraction forces which work to the movable member and are generated by magnetic circuits formed between the flange sections and the adjacent yokes and between the flange sections, the end yoke, and the adjacent yokes when an electric current is supplied to the electromagnetic coils with the changing of the current direction. A restoring force for returning the movable member toward a center of a stroke is generated by magnetic circuits formed between the movable member and the adjacent yokes when the movable member is located on one of the sides and supplying the electric current to the electromagnetic coils is turned off.

The Examiner states that Norio et al. discloses the invention as claimed except for non-magnetic material or an air space between the yokes of adjacent electro-magnetic coils. The Examiner relies upon JP '468 as disclosing this feature, referring to the spacer as elements 11, 13.

However, there are several differences between Norio et al. and the invention, as claimed. In Norio, magnetic flux working surfaces are formed in both axial end parts of the pole pieces 5 to move a movable member 3. Norio et al. discloses an E-shaped yoke. One center yoke is provided between end yokes so there are no adjacent yokes nor a space or spacer provided to the central end face, as is claimed. Moreover, the movable member 3 of Norio et al. does not have the magnetic flux working surfaces corresponding to the flange sections 15b on each end of the movable member 10 of the invention, as recited in the claims. Claim 1 recites that the movable member has flange sections formed at both axial ends and outer circumferential faces of the flange sections act as magnetic flux working surfaces. This arrangement is not disclosed by Norio et al. as the magnetic pole pieces 5 do not act as magnetic flux working surfaces.

Also, the yokes of Norio et al. do not face the flange sections of the moveable body. Claim 1 recites that yokes made of a magnetic material are provided to end faces of the electromagnetic coils to face the flange sections of the movable body, a relationship not disclosed by Norio et al.

The yoke 1 of Norio et al. faces the side of a movable body 3 and it is a side plate 7 which face the flange sections of the movable body.

The Examiner relies upon JP '468 only for disclosing the claimed spacers. As noted in JP '468, the yoke pieces are connected by connecting aids 11, 13 including a screw shaft 11 and the Examiner alleges that these elements meet the claimed recitations of spacers. It is clear from Figure 2 that the yoke pieces 1c are connected by a threaded shaft 11 and nuts 13. Therefore, the connecting aids 11, 13 do not meet the limitations of a non-magnetic material or air space between yokes of adjacent electromagnetic coils.

Because JP '468 does not disclose the use of a non-magnetic spacer or air space between yokes of adjacent electro-magnet coils and because Norio et al. does not disclose all features alleged by the Examiner, the rejection should be withdrawn and the application allowed.

In addition, the claim has been amended to further define the invention over the prior art. Specifically, the claim now recite a restoring force returning the movable member to a center of a stroke created by magnetic circuits formed between movable member and adjacent yokes when the movable member is located to one of the sides and the electric current to the electro-magnetic coils is turned off. In the invention, the restoring force is generated by magnetic circuits formed between the movable member 10 and adjacent yokes 26 d, 26e.

In Norio et al., if the current is turned off and the movable member 3 is located in the vicinity of a stroke, no restoring force is generated due to magnetic resistance. Likewise, in JP '468, if electric current is turned off, a restoring force cannot be increased because the magnetic pole piece 5 and end yoke 1c are widely separated at the stroke end.

Applicants respectfully submit that this combination of elements as set forth in independent claim 1 is not disclosed or made obvious by the prior art of record, including Norio et al. or JP '468.

Conclusion

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. It is believed that a full and complete response

has been made to the outstanding Office Action, and as such, the present application is in condition for allowance.

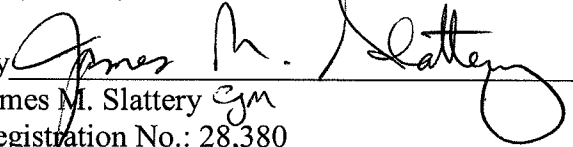
If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone Chris McDonald, Registration No. 41,533, at (703) 205-8000, in the Washington, D.C. area.

Prompt and favorable consideration of this Amendment is respectfully requested.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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